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RESEARCH ARTICLE

First record of the walnut leaf miner *Caloptilia roscipennella* (Lepidoptera: Gracillariidae) in Belarus, with a note on synonymy

Первая находка тощей ореховой моли *Caloptilia roscipennella* (Lepidoptera: Gracillariidae) в Беларуси, с заметкой о синонимии

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Abstract. The walnut leaf miner *Caloptilia roscipennella* (Hübner, 1796) is recorded for the first time in Belarus. The larvae of this species damage leaves of the common walnut (*Juglans regia* L.). In 2015, *C. roscipennella* was registered in a number of geographical locations in the Brest and Gomel provinces. In subsequent years, the species was found only in the same places. It is shown that the name *C. roseipennella* Anikin, Zolotukhin et Kirichenko, 2016, **syn. nov.**, being an unjustified emendation, is a junior synonym of *C. roscipennella* (Hübner, 1796) in accordance with the International Code of Zoological Nomenclature, Articles 32.5.1 and 33.2.3.

Резюме. Тощая ореховая моль *Caloptilia roscipennella* (Hübner, 1796) впервые зарегистрирована в Беларуси. Личинки этого вида повреждают листья грецкого ореха (*Juglans regia* L.). В 2015 г. моль была найдена в ряде географических точек Брестской и Гомельской областей. В последующие годы места её регистрации оставались неизменными. Показано, что название *C. roseipennella* Anikin, Zolotukhin et Kirichenko, 2016, **syn. nov.**, будучи неоправданной поправкой, является младшим синонимом *C. roscipennella* (Hübner, 1796) в соответствии со статьями 32.5.1 и 33.2.3 «Международного кодекса зоологической номенклатуры».

Key words: walnut leaf miner, invasive pest, alien species, common walnut, new synonym, Lepidoptera

Ключевые слова: моль тощая ореховая, инвазивные вредители, чужеродные виды, грецкий орех, новый синоним, Lepidoptera

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Introduction

Biological invasions by alien species are recognised as a significant component of global environmental change, and they often result in a significant loss in the economic value, biological diversity and function of invaded ecosystems (Vitousek et al., 1997; Wittenberg & Cock, 2001). The list of the most dangerous alien species of animals in the fauna of Belarus was published five years ago

(Alehnovich et al., 2016). A special place among the dangerous invasive and alien species is occupied by phytophages (Buga, 2015).

The common walnut, or English walnut (*Juglans regia* L.) was introduced into Belarus, and was widely planted in parks and large gardens in 1950–60s (Boboreko et al., 1982). At present, the English walnut is widespread in large gardens in central and southern Belarus. In the XXI century, two species of walnut phytophages, namely the mite *Aceria erinea* (Nalepa, 1891) and the aphid *Panaphis juglandis* (Goeze, 1778) were recorded as walnut pests in Belarus by Sautkin et al. (2016) and Buga & Zhorov (2016), respectively. The third such species, *Caloptilia roscipennella* (Hübner, 1796), is recorded here for the first time from Belarus.

These three naturalised, post-invasive species (Pyšek, et al., 2002) had inhabited the territory in the past and since the beginning of their study are known as fully naturalised, without any changes in their distribution. They evidently invaded Central Europe before 1900 and it is impossible to trace whether they were distributed with their host plant, followed it immediately, or invaded the territory with some delay in time. Apparently, the invasions of many species took place long after their host plants were introduced, at the same time it implies that the distribution of the host may be not the only factor initiating an invasion in several cases (Šefrová & Laštůvka, 2005).

Caloptilia roscipennella, whose larvae feed in leaf mines on the common walnut, is expanding within Europe (being alien in Europe). Its native range included the part of Southern Europe and South West Asia (Lopez-Vaamonde et al., 2010). The species was registered in Germany in the XIX century (Schmid, 1887). Within Europe, this species was found in the present-day territory of the Czech Republic in 1905 (Šefrová & Laštůvka, 2005), in the territory of Poland in 1991 (Buszko, 1992), then in 1995 in Bulgaria (Trenchev & Tomov, 1996), in 2012 in Turkey (Öztürk et al., 2015), and in 2017 in Serbia (Dobrosavljevic, et al., 2017). To date, *C. roscipennella* is known within Europe in Austria, Belgium, Switzerland, Spain, France (including Corsica), Hungary, Italy (including Sicily), Moldova, Romania, Russia, and Ukraine, as an alien species (Lopez-Vaamonde et al., 2010). In Russia, this species is distributed in the West Caucasus region (Baryshnikova, 2008).

Material and methods

The mined leaves of the common walnut were collected during the vegetation period in 2015. The first identification of the leaf mining species was made in the field conditions on the basis on the characteristics of the mines. The photos were taken using a Canon EOS 1100D digital camera (objective Helios 44-2 2/58 with an extension tube). The map was built using R software.

Results and discussion

Family **Gracillariidae**

Subfamily **Gracillariinae**

Genus ***Caloptilia*** Hübner, [1825]

Caloptilia roscipennella (Hübner, 1796) (Fig. 3)

Tinea roscipennella Hübner, 1796: 68, pl. 29, fig. 198.
Caloptilia roseipennella Anikin, Zolotukhin et Kirichenko, 2016: 59, **syn. nov.**

Material examined (Fig. 2). **Belarus**: *Brest Prov.*: Zhabinka Distr., Zhabinka, 52°12′05.1″N 24°00′56.6″E, 7.VIII.2015, coll. A.V. Sinchuk; Kobryn Distr.: Verholesye Vill., 52°04′56.5″N 24°18′09.0″E, 7.VIII.2015, same collector; Kobryn, 52°11′48.2″N 24°20′23.8″E, 8.VIII.2015, same collector; Baranovichi Distr., Baranovichi, 53°07′34.1″N 26°02′57.0″E, 6.IX.2015, same collector; Brest, 52°06′39.4″N 23°42′44.9″E, 6.IX.2015, same collector; *Grodno Prov.*, Svislach Distr., Svislach, 53°1′54″N 24°6′28″E, 21.VIII.2015, coll. A.S. Roginsky; *Gomel Prov.*: Loyew Distr., Loyew, 51°56′07.1″N 30°47′51.9″E, 5.X.2015, coll. A.V. Sinchuk; Gomel, 52°25′46.7″N 30°59′21.1″E, 5.X.2015, same collector; Rechytsa Distr., Rechytsa, 52°21′55.5″N 30°23′41.1″E, 16.X.2015, coll. S.V. Buga.

Nomenclatural note. The corrected name of this species was published relatively recently with the reference to its presumable original spelling (Anikin et al., 2016): *Caloptilia roseipennella* (Hübner, 1796). This is an unjustified emendation, according to the Article 33.2.3. of the International Code of Zoological Nomenclature, since the original publication does not contain any evidence of an inadvertent error which must be corrected in accordance with the Article of 32.5.1.

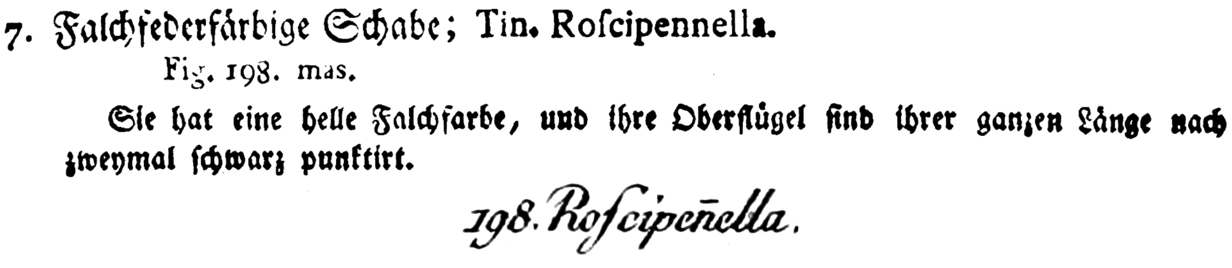

7. Falchfederfärbige Schabe; Tin. Roſcipennella.
Fig. 198. mas.
Sie hat eine helle Falchfarbe, und ihre Oberflügel ſind ihrer ganzen Länge nach zweymal ſchwarz punktirt.
198. Roſcipeñella.

Fig.1. Copy of the description of *Caloptilia roscipennella* (above) and the spelling of the species name in the caption to figure (below) from the original publication (Hübner, 1796).

In the original publication, the name "*Tin. Roscipennella*" is clearly printed in the description of the species and is repeated in the caption to the plate of figures 29 (Fig. 1). This author's cursive cutline to the drawing of the moth, representing only the species name, is also clearly read as *roscipenella* (with a single "*n*"; doubling of this consonant is shown with a horizontal bar above the letter). Hübner did not explain the origin of the species name. This name can be connected with the black dots which are located against the pale, uniformly coloured forewing background defined by the author, and resemble drops of dew (the Latin words *ros* and *roscidus* mean "dew" and "dewy", correspondingly) instead of the "roseus" colour of the wings as it was assumed by the authors of the corrected name. In addition, Hübner subsequently applied this name without correction, precisely as "*roscipennella*", for example, in the work where the genus *Caloptilia* was described*.

New record. Caloptilia roscipennella was detected in the southern part of Belarus, where it presumably penetrated from Poland or Ukraine. Earlier, it was found in the Mielnik Village (52°20′N, 23°3′E), Podlaskie Voivodeship, Poland in 2011 (J. Buszko, pers. comm.). In Belarus, the species was recorded for the first time on 7.VIII.2015 in Zhabinka (Zhabinka District) and the Verholesye Village (Kobryn District), then on 8.VIII.2015–16 X.2015 in Kobryn (Kobryn District), Svislach (Svislach District), Baranovichi (Baranovichi District), Brest of the Brest Province; in Loyew (Loyew District), Gomel and Rechytsa (Rechytsa District) of the Gomel Province (Fig. 2). In subsequent years, the species was found only in the same places.

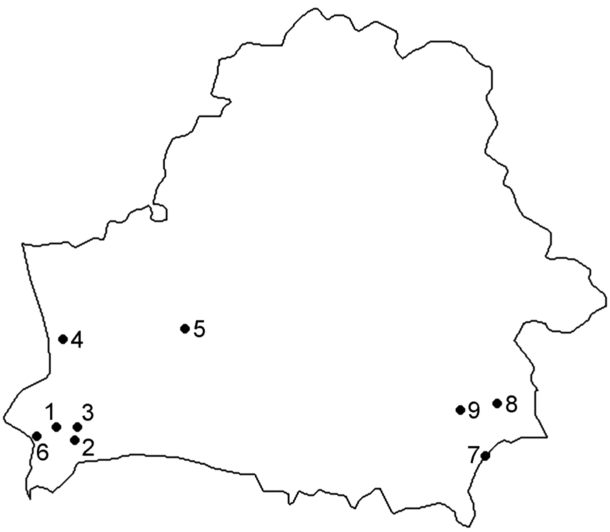


Fig. 2. Distribution of *Caloptilia roscipennella* in Belarus. **1**, Zhabinka; **2**, Verholesye Vill.; **3**, Kobryn; **4**, Svislach; **5**, Baranovichi; **6**, Brest; **7**, Loyew; **8**, Gomel; **9**, Rechytsa.

* Proposed here etymology of the species name seems at first sight not quite convincing because, according to Latin grammar, the name derived from the noun *ros* should be *roripennella* (genitive case of *ros* is *roris*, word stem is *rori*-); the name derived from the adjective *roscidus* should be *roscidopennella* (word stem is *roscid*-). The absence of the suffix *-id-* in the name suggests a different etymology. Names with the element *rosci*- exist in the nomenclature, e.g. *Pyrrhopyge roscius* Hopffer, 1874, *Trachys roscia* Obenberger, 1929, *Philonthus roscius* Smetana, 1995, etc, but all of them are derived from the Roman proper name *Roscius*, except for one case known to me, *Waigeum miraculum* f. *roscia* Fruhstorfer, 1908. Probably, the latter name is formed in the same way as the name by Hübner. The description of *Tinea roscipennella* was given in one sentence: "Sie hat eine helle Falchfarbe, und ihre Oberflügel sind ihrer ganzen Lange nach zweymal schwarz punktirt", and the vernacular name proposed by the author for the species is Falchfederfarbige. The enigmatic word "falch" in Upper German means "cow or horse of fawn colour" (An Etymological Dictionary of the German Language by F. Kluge, 1891 translated by J.F. Davis).

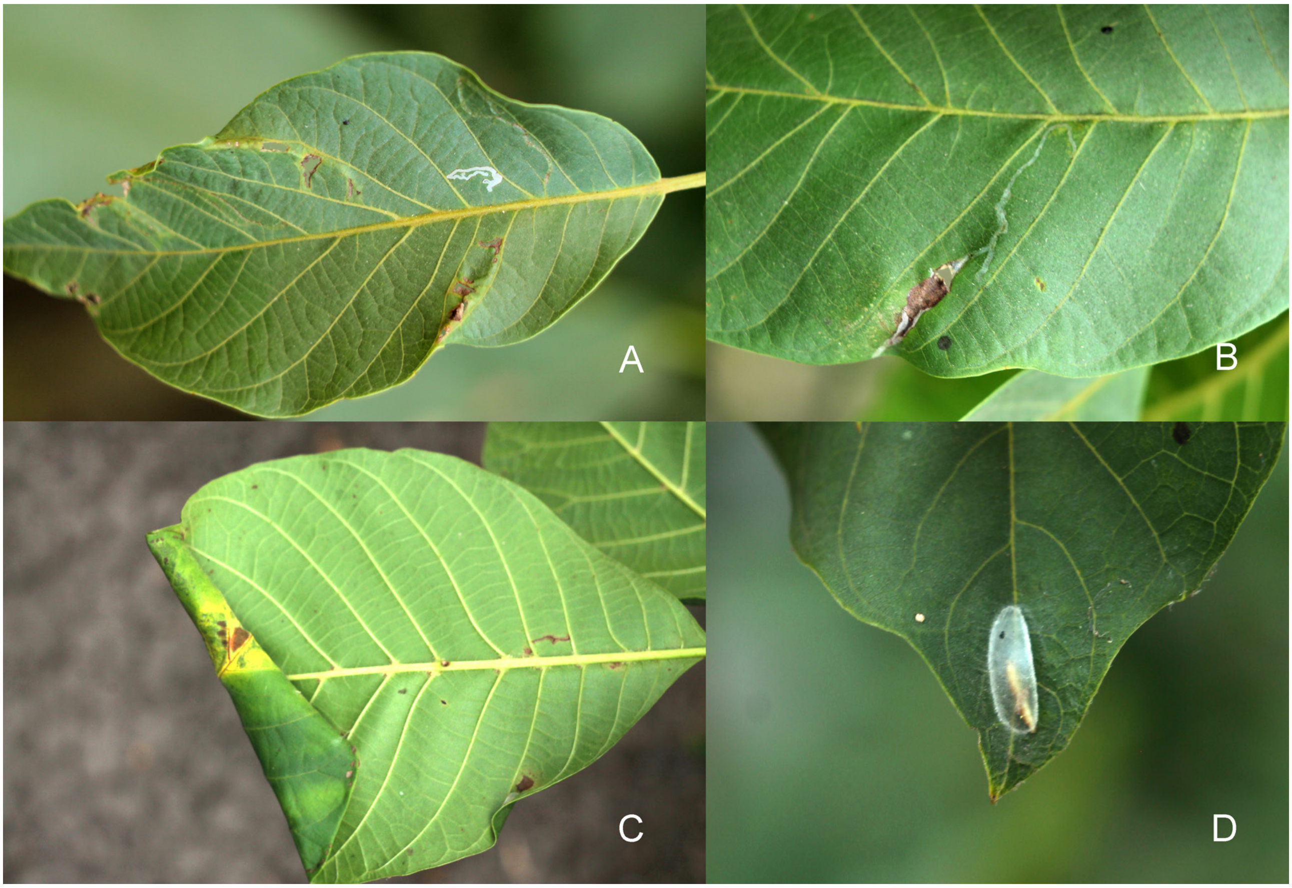


Fig. 3. Damage caused by the larvae of *Caloptilia roscipennella* to the leaf plates of *Juglans regia*. **A**, **B**, leaf mines; **C**, leaf roll; **D**, cocoon with pupa. Photo by A.V. Sinchuk.

Bionomics and economic importance. The mines are epidermal, silvery, lower- or upper-surface corridors (Fig. 3 A) widening into a blotch. The corridor is widening into a narrow tentiform mine, usually close to the leaf margin (Fig. 3 B). After vacating the mine, the larva lives in a leaf roll (Fig.3 C) (Patočka & Zach, 1995; Ellis, 2007). Pupation takes place in the hyaline-looking membranous cocoon outside the mine (Fig.3 D).

In 2015, *C. roscipennella* damaged 15–20% of *Juglans regia* leaves in Baranovichi, approximately 10% in Rechytsa, and less than 5% in other localities. In Belarus, the distinctive damage pattern of the walnut leaf miner was observed on *J. regia* trees planted in parks and large gardens. The significance of this species as a pest of *J. regia* in Belarus cannot be established with certainty, but severe damage caused to plants is possible in the future. Therefore, it is important to study this alien species trophically associated with the common walnut, the plant which is promising for the wide cultivation in Belarus.

That is, Hübner meant the "pale yellowish-brown colour" (Cambridge Dictionary) of his new species. This has nothing to do with "roseus" colour, therefore, it is indeed possible to exclude a typo in the species name. The phrase "...Oberflügel sind ihrer ganzen Lange nach zweymal schwarz punktirt" (upper wings along the entire length with double black punctation) also has little to do with the word *roscidus* meaning "full of dew, wet with dew, dewy; moistened, watered, wet" (A Latin Dictionary by Ch.T. Lewis & Ch. Short, 1879). However, Hübner knew the name *Noctua roscida* [Denis et Schiffermüller], 1775 (= *Tinea roscidella* Fabricius, 1794) since he quotes both of these synonyms in the same work of 1796 (p. 7). Obviously, the species name *roscida* reflects the colouration of the forewings which are in this species as if splattered, but not with dew, but rather with dirt. Probably, Hübner wanted to reflect the similar character, with the same word, but he "lost" a part of the first stem in the compound word *roscidopennella* (he later followed the correct spelling in his names *Tortrix roscidana* Hübner, 1799 and *Epelis roscidaria* Hübner 1823). Therefore, the etymology proposed by the authors of this article is plausible. (*Editor-in-Chief's Note*).

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